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**MICROBIAL SOLUTIONS COMPLETES SUCCESSFUL TRIAL OF ENVIRONMENTAL TOXIN-EATING TECHNOLOGY.** *BAE Systems in negotiation for 25 tonne bioreactor treatment plant.*

Microbial Solutions Ltd, an Oxfordshire company developing award-winning innovative technologies to assess and dispose of toxic metal working fluids used in the engineering industry, has completed a successful trial of a commercial scale bio-reactor with BAE Systems. The industry-leading nature of Microbial Solutions' technology, and the success of the collaboration with BAE, has been recognised by the presentation of a BAE Systems Chairman's Award in the innovation category.

Microbial Solutions has developed an innovative, ecologically friendly bacterial treatment, known as Microcycle™ Technology, which turns toxic exhausted metal working fluids into grey water that is safe to dispose of in the sewerage system.

Metal working fluids are vital in any industry that requires precision cutting of metal. They are essentially cooling lubricants, sprayed in the machining process to ensure a clean cut, and which contain a number of toxic and dangerous chemicals and compounds that must be rendered less harmful before used fluids can be disposed.

Microcycle™ Technology involves the use of a bio-reactor, a large cylinder containing a plastic matrix into which the metal working fluids are poured. A specifically selected consortium of bacteria is introduced into the bio-reactor. These bacteria affix to the matrix and consume the toxins and chemicals, reducing the pollution load of the fluids by up to 98%. The grey water produced has a pollution load below the currently required standards for sewer disposal. Additional benefits are that the toxic components are converted to harmless gas and there is no residual oily waste to dispose of.

Microcycle™ Technology replaces costly and energy intensive disposal processes, such as vacuum evaporation and ultra filtration which also produce toxic oily waste residue that

is transported to landfill for disposal, where its anaerobic degradation produces methane, a significant greenhouse gas.

As part of a commitment to backing innovation and new technology, BAE Systems, the global defence and aerospace systems manufacturer, commissioned a trial bio-reactor from Microbial Solutions for its facility at Brough in East Yorkshire. This 5-tonne reactor, 3.5m high by 1.5m in diameter, has been in operation since early 2008 and has proved highly successful. BAE Systems and Microbial Solutions are now in discussions to extend the plant to a total capacity of 25 tonnes, which will be capable of processing around 0.5 million litres of waste metal working fluid per year, and are exploring options for taking the technology to other BAE Systems sites.

Professor Will Pope, Chief Executive Officer of Microbial Solutions, said: "We're very pleased that the trial with BAE Systems has proved the potential of Microcycle™ Technology. It has been a pleasure to work with such a forward-thinking company that can see the benefits of our systems. Reducing the need for landfill, and avoiding other more energy-intensive processes, Microcycle™ Technology is environmentally sound and can cut costs. Working with BAE Systems, we've shown that it works on an industrial scale. Winning a Chairman's Award is a great bonus and recognition of the hard work of the entire team."

Industrial companies face pressure from regulators to reduce the pollution and toxicity of waste fluids as well as the amount of waste sent to landfill and climate change gas emissions. Microcycle™ Technology can help them meet their targets while generating significant cost savings as disposal costs rise – in Europe alone, they are estimated at around €1bn per annum.

Pope said: "Following on from the successful pilot with BAE Systems we are working towards a commercial launch of Microcycle™ Technology later in 2009."

Andy Southwick, BAE Systems Estates Team Leader at Brough, said: "It's been exciting to be part of such a successful project and the Chairman's Award is recognition of how well everything has gone. We are examining how best to progress and co-operate further with Microbial Solutions. This will involve increasing the number of reactors we have at the Brough site and introducing the technology to other BAE Systems facilities."

Peter Fish, BAE Systems Estates Manager, said: "Microbial Solutions' reactor solves a number of problems at once: it can save costs and also helps us meet our environmental obligations. We have a site of special scientific interest near our Brough plant, and we

have to be very careful when transporting, treating, or disposing of waste. Being able to remove the toxins from metal working fluids so effectively is a huge benefit. We're very pleased the trial has worked so well and look forward to continuing our excellent working relationship with the Microbial Solutions team."

Microbial Solutions works in partnership with Houghton Europe, the leading provider of industrial fluids, with the objective of providing a complete supply and treatment process to major manufacturing companies. Microbial Solutions is a spin-out company from the Centre for Ecology and Hydrology, a research centre owned by the Natural Environment Research Council.

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#### **Editors Notes**

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#### **Images available on request**

1. Photos of Professor Will Pope, CEO of Microbial Solutions, and BAE Systems team members with the bioreactor at BAE Systems site in Brough, East Yorkshire.
2. Chart showing the pollution load of operationally exhausted machine coolant before (red) and after Microcycle™ treatment (blue).

#### **1. About Microbial Solutions Ltd**

Microbial Solutions is a spin-out company from research conducted at the Centre for Ecology & Hydrology, a wholly owned research centre of the Natural Environment Research Council (NERC). In December 2007, the company raised £1.2 million to commercialise its innovative wastewater treatment process and is located at the DiagnOx Laboratory, Cherwell Innovation Centre, north Oxfordshire.

Microbial Solutions has developed a treatment process known as Microcycle™ Technology, which uses a patent-protected collection of non-pathogenic, clever bacteria to remove the toxic components from metal working fluids (oily lubricants used to ensure clean cutting processes in industry) and produce grey water that is safe to dispose of in the sewerage system.

The bacterial consortium has been carefully selected following a worldwide search of hundreds of bacteria that survive naturally in machine sumps, where they eat metal working fluids. In their 'natural' conditions in machine sumps, these bacteria can only survive in very low concentrations because of the conditions.

After isolating complementary bacteria that co-exist without destroying each other and eat the different components of waste metal working fluids, Microbial Solutions ensures that they can thrive in its bioreactors (cylinders) by providing an appropriate environment for them to grow and increase in biomass. The bugs convert the wastes to biomass and the process produces some carbon dioxide, which is 20 times less harmful than methane as a greenhouse gas.

Current disposal processes for metal working fluids require the used fluids to be transported offsite by tanker to specialist treatment facilities. These treatment processes are expensive and leave a residual oily waste that has to be transported to landfill for disposal, where their anaerobic degradation produces the high impact climate change gas, methane.

For more information: [www.microbial-solutions.co.uk](http://www.microbial-solutions.co.uk)

#### **2. About Microbial Solutions management team**

Microbial Solutions was founded by Prof Ian Thompson and Dr Christopher van der Gast of the Centre for Ecology & Hydrology who remain members of the Company's Strategic Advisory Board, and shareholders along with NERC.

The other founders and management team members include Prof William Pope, CEO, who is one of the UK's leaders in managing and developing environmental companies over the last 25 years, and four times a winner of the "Technology Fast 50" awards for the fastest growing companies, and is 2008 "Business Innovation Support person of the Year", awarded by the SPARC Technology Network. Prof Pope is also a founder director and past Chairman of the Society for the Environment and Vice-President of the Institution of Environmental Science, and a non-executive director of EEDA, the East of England Development Agency.

David Whitby, Chairman, is CEO of Pathmaster Marketing Ltd, an oil, gas and energy industry consultancy and was formerly Business Manager with BP Ventures; Prof Geoff Randall OBE, non-executive director, was formerly Director of Global Safety for Astra Zeneca and is Vice President of the Marine Biological Association; Dr David Kelly, non-executive director, is CEO of H2O Venture Partners and a former director of Oxitec, which has developed an environmentally friendly pest control technology; Dr Victor Christou, non-executive director, is Senior Investment Manager at Oxford Capital Partners; and Dr Duane Ager, formerly of the Centre for Ecology and Hydrology, is Chief Scientific Officer.

### **3. About BAE Systems**

BAE Systems is the premier global defence and aerospace company delivering a full range of products and services for air, land and naval forces, as well as advanced electronics, information technology solutions and customer support services. With approximately 100,000 employees worldwide, BAE Systems' sales exceeded £15.7bn in 2007. The company's annual research and development spend exceeds £1.4bn. For more information: [www.baesystems.com](http://www.baesystems.com)